Commentary: Missing a beat? Implications of heart block with rapid-deployment aortic valve replacement

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The significant advantages conferred to surgical aortic valve replacement (SAVR) by the advent of rapid-deployment prostheses, like the sutureless balloon-expanded Intuity system (Edwards Lifesiences, Irvine, Calif), appear to come at a price in the form of higher rates of permanent pacemaker implantation (PPI) compared with SAVR using conventional sutured valve prosthetics. Although this observation has been well documented in several prior studies of isolated rapid-deployment AVR (RD-AVR), Coti and colleagues' further characterize this finding by examining the influence of perioperative conditions, including pre- and postoperative conduction abnormalities and combined procedures, on the need for PPI after RD-AVR in a large patient cohort with up to 5 years of follow-up.

Make no mistake, PPI after AVR is more than simply a nuisance, but rather a significant complication not only in terms of procedure-related risks and device infection, but also of the reported increase in morbidity and mortality associated with PPI after both transcatheter AVR (TAVR) and SAVR at long-term follow-up. Long-term right ventricular apical pacing has been associated with mortality and rehospitalization for heart failure in patients with structural heart disease as well as an increased incidence of pacing-induced cardiomyopathy in patients without overt structural heart disease. Although recently reported results from the Placement of Aortic Transcatheter Valves 3 trial indicated no difference in the incidence of new PPI between TAVR and conventional SAVR among low-risk, younger patients, this finding may not translate to the same types of patients undergoing RD-AVR. Low-risk patients attracted to minimally invasive RD-AVR may be exchanging reduced short-term peri procedural morbidity for potentially greater risks associated with PPI amortized over the longer-term. These considerations warrant focusing on identifying and possibly mitigating risk factors contributing to PPI after RD-AVR (and TAVR as well).

Although the finding by Coti and colleagues that preoperative right bundle branch block was the dominant conduction abnormality associated with early PPI is also reflected in prior studies, other conduction anomalies, including first-degree atrioventricular block and left anterior hemiblock were significant predictors of PPI across the entire follow-up period. This suggests that any conduction abnormality identified preoperatively warrants consideration in selecting a rapid-deployment prosthetic, particularly in low-risk patients. Moreover, the identification of concomitant procedures as an independent predictor for PPI after RD-AVR potentially influences the rationale for using a rapid-deployment prosthetic in the interest of reducing crossclamp and cardiopulmonary bypass times in combined operations.

The similarities between deploying TAVR and RD-AVR prosthetics using balloon-expanded radial forces on the left ventricular outflow tract and conduction system present another opportunity for collaboration between surgeons and interventional cardiologists to explore modifications in deployment techniques and device design to reduce the risk of significant heart block seen with both approaches. For example, Di Eusanio and colleagues’ noted that the
risk of PPI implantation after RD-AVR is reduced over time in expert centers, suggesting that implant technique influences the incidence of heart block for these new devices akin to how surgical technique (eg, annular debridement and suture placement) likely influence the incidence of heart block with conventional SAVR.

References

Commentary: Pacemaker requirement with rapid-deployment aortic valves

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“You and I travel to the beat of a different drum”
—Linda Ronstadt

The treatment options for severe aortic stenosis in symptomatic patients have changed dramatically in the last decade. When we started our practices and the decision to treat aortic stenosis was made, the only option was surgery and the only choice was between mechanical and tissue valves. True, there were multiple types of mechanical and tissue valves, but selecting a specific valve was usually a decision of minor consequence. Once this choice was made, competing claims for superiority of one valve over the other were usually difficult to substantiate. Fast-forward to current day, and we now have new options to consider, including transcatheter aortic valve replacement (TAVR), minimally invasive surgical techniques, and rapid-deployment (RD) surgical valves. Each option has potential advantages and disadvantages that become increasingly important as we treat younger and lower-risk patients whose potential postoperative survival is longer. Two RD valves are currently available: the balloon-expandable Intuity valve (Edwards Lifesciences, Irvine, Calif) and the self-expanding Percival valve (LivaNova, London, England).